

Appl. No. : 10/642,952  
Filed : August 18, 2003

### REMARKS

Claim 24 has been amended to clarify the invention. Support can be found at page 10, lines 5-9, for example. No new matter has been added. Applicant respectfully requests entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

#### Rejection Under 35 U.S.C. § 112, first paragraph

Claims 24-28, 30 and 31 have been rejected under 35 U.S.C. § 112, first paragraph, with regard to the phrase "increased as a function of the sodium oxide content and the average pore radius" in claim 24. Claim 24 has been amended based on the disclosure at page 10, lines 5-9, for example, thereby obviating this rejection.

#### Rejection Under 35 U.S.C. § 112, second paragraph

Claims 24-28, 30 and 31 have been rejected under 35 U.S.C. § 112, second paragraph, with regard to the phrase "producing dimethyl ether at a conversion ratio of methanol to produce dimethyl ether" in claim 24. Claim 24 has been amended to clarify the phrase, thereby obviating this rejection.

#### Rejection Under 35 U.S.C. § 103

Claims 13-17, 19, 20, 24-28, 30, and 31 have been rejected under 35 U.S.C. § 103(a) as obvious over Inomata. Claims 13 and 24 are independent, and Applicant respectfully traverses this rejection.

Claim 13 recites:

obtaining an activated alumina catalyst by using as criteria its sodium oxide content and its average pore radius, wherein the sodium oxide content is 0.07% by weight or less and the average pore radius is no less than 2.5 nm but less than 5.0 nm, said activated alumina catalyst having a pore volume of no less than 0.125 mL/g but no more than 0.45 mL/g; and

dehydrating methanol in vapor phase in the presence of the activated alumina catalyst, wherein no active component other than the activated alumina is added to the activated alumina catalyst, thereby producing dimethyl ether.

The Examiner states:

Imata et al. teach that a pore radius of less than 30 nm can be utilized (see page 5). Thus, although Imata et al. expressly disclose the average pore radius to be from 5 to 10 nm, there is a suggestion that this radius can be modified. Particularly since Imata et al. teach that control of the physical properties of the  $\gamma$ -alumina catalyst is directly related to the long-term stability of the catalytic activity (page 5). One of the physical properties disclosed as being related to the long-term stability and activity of the catalyst is the average pore radius (see page 5). Thus, Imata et al. gives the ordinary skilled artisan motivation to modify the average pore radius. (Emphasis added.) Page 4, the last paragraph

However, Imata et al. states:

The porous  $\gamma$ -alumina catalyst used in the present invention is **required** to have a surface area of 210-300 m<sup>2</sup>/g, preferably 230-290 m<sup>2</sup>/g; a volume of the pores with 300 Å or less in radius of 0.60-0.90 ml/g, preferably 0.62-0.85 ml/g; and an average pore radius of 50-100 Å, preferably 50-85 Å. (Emphasis added.) Page 4, lines 14-17 of the English translation of record

In the above, despite the fact that Imata et al. mentions the average pore radius, Imata et al. explicitly states that the porous  $\gamma$ -alumina catalyst is **required** to have an average pore radius of **50-100 Å**, preferably **50-85 Å**. Thus, although Imata et al. gives the ordinary skilled artisan a certain motivation to modify the average pore radius, Imata et al. does not give the ordinary skilled artisan a motivation to modify the average pore radius to **less than 50 Å** (5 nm) or teaches away from the average pore radius of **less than 50 Å** (5 nm).

Further, Imata et al. specifically show that the use of porous  $\gamma$ -alumina catalyst having an average pore radius of 81 Å (Example 2) provide a better long-term stability (Table 2 on page 6) as compared with the catalyst having an average pore radius of 54 Å (Example 1, Table 1 on page 6) or the catalyst having an average pore radius of 55 Å (Example 3, Table 3 on page 7). Thus, the ordinary skilled artisan cannot reasonably be motivated to modify the average pore radius to **less than 50 Å** (5 nm).

In *Optivus Technology, Inc. v. Loma Linda University Medical Center* (\_\_\_ F.3d \_\_\_ (Fed. Cir. 2006)(Linn, J.), 2006 U.S. App. LEXIS 28332), the Court noted that “[a] reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be

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discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” Based on that test, Imata et al. teach away from “the average pore radius is no less than 2.5 nm but less than 5.0 nm” recited in claim 13 because Imata et al. specifically states that the average pore radius of 50-100 Å is required and the examples clearly show the average pore radius of 81 Å was better than the average pore radius of 54 or 55 Å, and thus the ordinary skilled artisan would be discouraged from using the average pore radius of less than 50 Å.

In view of the foregoing, not all of the limitations of claim 13 are not taught or suggested by Imata et al., and thus claim 13 cannot be *prima facie* obvious over Imata et al. At least for this reason, the claims which depend from claim 13 also cannot be *prima facie* obvious over Imata et al.

Further, the attached Declaration under 37 C.F.R. § 1.132 shows that the average pore radius (R) predominantly controls long term stability of activity, as compared with the other characteristics, and in the catalysts having a controlled amount of sodium oxide (i.e., 0.07% by weight or less), when the average pore radius is over 5 nm (5.5 nm and 6.6 nm), long term stability of activity is drastically dropped (¶¶4, 5). This evidence supports unobviousness of the recitation “the average pore radius is no less than 2.5 nm but less than 5.0 nm” in claim 13. Thus, also for the above reason, claim 13 cannot be obvious over Imata et al. At least for this reason, the claims which depend from claim 13 also cannot be obvious over Imata et al.

Claim 24 recites limitations similar to those recited in claim 13 which have been discussed above. The same discussions apply to unobviousness of claim 24, and accordingly, claim 24 and its dependent claims cannot be obvious over Imata et al.

Applicant respectfully requests removal of this rejection.

### **CONCLUSION**

In light of the Applicant's amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

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Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: January 18, 2007

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